IN THE UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF TENNESSEE, WESTERN DIVISION

ECIMOS, LLC.	)	
Plaintiff,	)	
v.	)	Case No. 2:15-cv-2726-JPM-cgc
CARRIER CORPORATION,	)	
Defendant.	)	

EXPERT REPORT OF JEREMY M. FLEMING

In accordance with Federal Rule of Civil Procedure 26(a)(2), the following is my written report describing the subject matter areas, background, and opinions about which I expect to testify in the present litigation if called upon to do so.

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II. QUALIFICATIONS AND COMPENSATION

1. I am above the age of 18 years old and the following statements are based on my professional knowledge and personal experience.
2. I am currently employed as a Senior Software Principal Engineer for Science Applications International Corporation ("SAIC").
3. I have a Bachelor of Science degree in Electrical Engineering (1998) from the University of Alabama in Huntsville and my true and correct curriculum vitae is attached and incorporated hereto as Attachment 1. I am a National Instruments Certified LabVIEW Architect and National Instruments Certified Professional Instructor with over 19 years of experience developing software applications with LabVIEW and over 17 years of teaching LabVIEW. As a Senior LabVIEW Developer at Amtec Solutions Group, Inc. ("Amtec"), I was the project lead on the software development services provided to Carrier Corporation ("Carrier"). I have also provided testimony in this case in a deposition taken on behalf of the Plaintiff by Ralph T. Gibson on September 13, 2017, in which I testified as to my qualifications and experience. That testimony is incorporated by this reference into this report.
4. I am not being compensated by the Defendant for the work I have performed on this engagement.

III. SCOPE OF WORK

5. I have been requested by Amtec to provide my software analysis expertise on behalf of Carrier in matter 2:15-cv-02726-JPM-cgc, in which ECIMOS, LLC ("ECIMOS") alleges violation of federal copyright statutes by Carrier. As I understand the allegations, they are that Carrier copied ECI's proprietary APIs and ECI Script files used in testing; that Carrier 'reverse engineered' the ECI software; that Carrier with the help of others was able to gain access to the ECI APIs and ECI Script Files; and that Carrier unlawfully reproduced, prepared, published and distributed plaintiff's copyrighted work. I have been asked to review these allegations and determine, based upon the manner in which the current Carrier software was developed by Amtec and the information and documentation which was utilized by Amtec in the development process, whether the current Carrier RES software evidences any direct or indirect copying, or any reverse engineering of the ECI software. I was also asked to review, analyze and respond to Plaintiff's Expert Report, as well as declarations and affidavits from Plaintiff.

6. I have been asked to review these allegations and determine, based upon the manner in which the current Carrier software was developed by Amtec and the information and documentation which was utilized by Amtec in the development process, whether the current Carrier RES software evidences any direct or indirect copying, or any reverse engineering of the ECI software.

IV. MATERIALS REVIEWED

7. In the course of my employment with Amtec and in connection with providing testimony related to the present case, I have reviewed the following materials:

   7.1. In my testimony in this case, I identified documents, information and communications which I reviewed in performing my work originally for Amtec and in connection with preparation for that deposition, all of which are incorporated by this reference into this report;

   7.2. The Carrier software source code ("RES software") and the RES database schema;

   7.3. The sworn testimony of Mr. James Chenault on September 9, 2017;

   7.4. The Expert Report of Mr. James Chenault submitted on September 29, 2017; and

   7.5. The affidavits of Mr. Olita, submitted on July 11, 2017 and September 29, 2017.

8. It is also important to state that neither during the work which I performed for Amtec, nor at any time since such work was performed have I had possession nor did I review any of the following:

   8.1. The ECIMOS ECI software source code ("ECI software") and ECI database schema;

   8.2. I have never been given access to review the ECI database formerly used by Carrier in its product testing operations.

9. I have relied upon these materials, as well as my education, training and experience, to conduct analyses and reach the opinions detailed in this report with a reasonable degree of professional certainty.

V. SUMMARY OF OPINIONS

10. Based on my years of experience in software, hardware, databases, and LabVIEW development and teaching, there is no way Amtec could have copied, or reverse engineered software or programming to which it did not have access. Amtec did not copy or reverse engineer ECI APIs and Scripts in Carrier's RES software as alleged. Amtec did not have access to the ECI software source code or APIs in question. Amtec could not have literally copied the ECI software, as ECI source code is written in Visual Basic 6 ("VB6"), while the Carrier RES software is designed using a visual programming language, LabVIEW's graphical programming language ("G"). Mr. Chenault did not find that the LabVIEW RES software was being used to "take control" of or otherwise misappropriate the ECI software.

VI. OPINIONS AND ANALYSIS

11. LabVIEW is systems engineering software for applications that require test, measurement, and control with rapid access to hardware and data insights. It was developed by National Instruments and first released in 1986. LabVIEW is a graphical programming language used to write software for various applications such as testing, data acquisition, networking, and control.

12. LabVIEW allows for rapid development of various applications and interfacing with a wide range of hardware from various vendors. LabVIEW interfaces with hardware from National Instruments as well as hardware and software from other vendors such as Aglinet, Tektronics, Opto22, Allen-Bradley, and multiple others. LabVIEW is used in multiple industries such as manufacturing, defense, aerospace, and educational. The RES software was designed so that the Opto22 hardware being used by Carrier could be replaced with National Instruments hardware for the data acquisition with minimal code changes required. The design approach used by Amtec to interface with the hardware has been used in multiple other applications in other industries.

13. In the RES application, LabVIEW was used by Amtec to implement control and data acquisition using hardware from Opto22, Quadtech, National Instruments, and the specific Carrier unit under test. The software interface to the various hardware was developed using information available from the hardware manufacturers. No information from ECI in this regard was provided, obtained from any source, or utilized by Amtec in developing the software interface to this hardware.

14. The RES software was developed on a time and materials contract for Carrier. The design and development process was an iterative process going through multiple development

cycles as new features were added and the project scope was revised. The project was laid out in multiple phases. Each phase was evaluated and revised as work was completed. Actor Framework was chosen as the software architecture. This is an object-oriented programming approach, chosen to provide maximum flexibility for modifications. The initial design requirements provided by Carrier to Amtec included eventually replacing the older Opto22 with National Instruments hardware. This influenced the design decision so that the hardware change could be made later in the project with minimal impact. The development started by creating manual interface panels for the system hardware. This was completed as part of phase 1, to prove the ability to interface and manually control the hardware used in the system. Commercially available documentation from Opto22 and Quadtech is all that was required, and in fact used, to complete the manual diagnostics panel. No pre-existing VB6 code was provided by Carrier or utilized. All software was written using LabVIEW no external VB6 code is called.

15. At no point did Carrier provide any VB6 software or code to Amtec to use in the development of the RES software, nor was any used. I am not a VB6 programmer and have never written or debugged a VB6 program. Amtec did not have VB6 programming expertise, and the programmer who performed most of the work for Carrier is not a VB6 programmer, who to my knowledge has never written or debugged a VB6 program. Until these proceedings, I was unaware of what development environment the original software had been written in. It was never mentioned or discussed with me by anyone at Carrier. I am unable to discuss the contents of the Carrier database used by the RES software. I was not involved with the input of information into the database. Our responsibility at ASG was to develop LabVIEW software to control the system hardware and interface with the Carrier database. Carrier input the information into the database used to execute the test

procedures.

16. In computer programming, an application programming interface (API) is a set of subroutine definitions, protocols, and tools for building application software. In general terms, it is a set of clearly defined methods of communication between various software components. A good API makes it easier to develop a computer program by providing all the building blocks, which are then put together by the programmer. Just as a graphical user interface makes it easier for people to use programs, application programming interfaces make it easier for developers to use certain technologies in building applications. By abstracting the underlying implementation and only exposing objects or actions the developer needs, an API simplifies programming. While a graphical interface for an email client might provide a user with a button that performs all the steps for fetching and highlighting new emails, an API for file input/output might give the developer a function that copies a file from one location to another without requiring that the developer understand the file system operations occurring behind the scenes. While in the broadest definition of an API, any software component communicating with another component could be called an API, traditionally an API refers more to a set of programming tools grouped to allow easier interface to another software component. One example of this in LabVIEW would be the database toolkit. This is a set of tools provided with LabVIEW that allow for easy access with standard database interfaces.

17. The RES software does not utilize any external APIs that are not native to LabVIEW. No VB6 code is utilized in the RES software.

18. Based on Mr. Olita's testimony as presented to me during my testimony he refers to the term script to represent test procedures. The LabVIEW RES software does not have any internal scripts or test procedures. The LabVIEW RES software bases its actions and

measurements upon instructions located in the Carrier database.

19. The RES software is capable of executing roughly 20 basic test functions. A simple overview of the operation is the scanning of the barcode of a unit to test. The RES software queries the database and retrieves the test steps and limits for that model. It then executes the steps in a sequential manner. After the steps are completed the overall pass or fail result for the unit is determined and the measurements captured as part of the test is stored back in a database.

20. No expert knowledge in the HVAC industry was needed or used by ASG to create and complete the RES software. The RES software provides control and interface to commercially available data acquisition equipment. Some of this such as the Opto22 and the Quadtech high pot tester were already present at Carrier. The National Instruments hardware was provided as part of this effort. The RES software was developed using LabVIEW programming methods and techniques we had utilized in multiple previous projects for other customers across multiple industries. Previous examples include using the Quadtech hi pot tester for wire harness testing for the nuclear industry and hydraulic pump testing for the U.S. Army. Opto22 hardware had been previously been used in projects for the metals industry.

21. Mr. Chenault's expert report agrees with my position that the RES LabVIEW software does not contain any ECIMOS IP. As he states "The LabVIEW code is innocuous in this respect as the ECIMOS IP exist inside the Carrier database." I am unable to offer any opinion as to contents of Carrier's database. I've never seen the contents of the original database claimed to be ECIMOS IP and was not involved with the creating and inputting of data into the new database.

22. Amtec, the developer of the RES software, was not given access to the ECI software source

code or APIs. Without access to the source code for the ECIMOS software, or the code for the APIs, Amtec could not and did not misappropriate the ECIMOS software.

23. I have reviewed the statement by Mr. Olita in his September 29, 2017 affidavit which refers to an email sent to Paula Davis, an employee of Amtec who worked to develop the RES software: "Attached to the foregoing email is an Excel spreadsheet that is replete with ECIMOS's valid tests ***which are the copyrighted APIs***." (emphasis added) This is not correct. The spreadsheet contains only the names of the so-called "APIs". The email spreadsheet attachment is notably lacking in any source code. There is nothing there to trigger the execution of the "APIs". In my opinion, the ***names*** of the ECIMOS valid tests ***are not*** the copyrighted APIs.

24. As I have explained above, an API is not the name used to label or identify the function performed, but rather the source code and programming which provides the functionality itself. Amtec did not copy or utilize any existing source code and programming from ECI.

25. It is not possible to directly compare the source code of the ECI software and the RES software. The ECI source code is written in the VB6, while the RES source code is written in G using the LabVIEW software. VB6 is a text-based language; it uses written text to generate windows, tabs, scripts, and other common program elements and functionality. Programs written in G, however, are constructed by combining visual representations of lab components. There is no program text that forms the basis of the functionality, rather a programmer connects virtual "nodes" with virtual "wires", to build a graphical block diagram, and these diagrams are connected via virtual "Front panels" and "connector panels". A text-based program cannot be directly compared to a visual program.

26. As noted above, I have given my deposition in connection with this case and I have responded to questions from both Plaintiff's and Defendant's counsel. To the extent that any of

my answers may be determined to be the expression of an expert opinion, I hereby incorporate those responses into this report, and adopt them. I reserve the right to express further opinions or to further address issues in connection with the matters involved in this case to the extent that further or additional information may be provided to me in the future.

VII. CONCLUSIONS

27. Based on my years of experience in software, hardware, databases, and LabVIEW development and teaching, there is no way Amtec could have copied, or reverse engineered, software or programming to which it did not have access. Amtec did not copy or reverse engineer ECI APIs and Scripts in Carrier's RES software as alleged. Amtec did not have access to its ECI software source code or APIs. Amtec could not have literally copied the ECI software, as ECI source code is written in Visual Basic 6 ("VB6"), while the Carrier RES software is designed using a visual programming language, LabVIEW's graphical programming language ("G"). Mr. Chenault did not find that the LabVIEW RES software was being used to "take control" of or otherwise misappropriate the ECI software.

Executed this 30 day of October, 2017

Jeremy M. Fleming

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CERTIFICATIONS

National Instruments Certified LabVIEW Architect
National Instruments LabVIEW Instructor (19 years Experience, 16 as instructor)
National Instruments DAQ Instructor (19 years Experience, 16 as instructor)

EMPLOYMENT HISTORY

February 2016 – Present – Sr. Software Principal Engineer, SAIC. Onsite contractor for Software Engineering Directorate (SED) at Redstone Arsenal

January 2014 – February 2016 – Sr. System Design Engineer – Amtec Solutions Group

December 2009 – December 2013: Sr. Software Engineer – Amtec Corporation
Secret Clearance

February 2008 – December 2009: Staff Engineer / Project Manager – The Patrick Wolffe Group, Inc., Systems Division

May 1998 - February 2008: Electrical Engineer / Project Manager – Mindready Systems formerly Radical Systems, Inc.

EDUCATIONAL BACKGROUND

B. S. Electrical Engineering (1998), University of Alabama in Huntsville

DEVELOPMENT SOFTWARE

LabVIEW	MS Visio
LabVIEW Real-Time	MS Excel
LabVIEW FPGA	MS Word
TestStand	MS Access
Requirements Gateway	MS Front Page
AutoCAD Electrical	MS Project

TEST PLATFORMS

PC / PCI / PXI / cPCI	FieldPoint/Compact FieldPoint
VXI (VME Extensions for Instrumentation)	IEEE 488 / GPIB Instrumentation
ARINC	Ethernet IP
Ethernet (LXI)	Device Net / CAN
Real-time Embedded Controllers	Compact RIO
Serial RS-232 / RS-485 / RS-422 / USB	JTAG
NI Vision / IEEE-1394	MIL-STD-1553

PROGRAM AND PROJECT MANAGEMENT

Lead for multiple projects from the initial customer meeting and proposal through scheduling, design, delivery, and implementation. Manager and lead for projects with several team members spanning multiple disciplines. Developed test plans and procedures for multiple applications. Skilled in problem solving, troubleshooting, and machine / system debug and repair. Prepare system and software documentation and validation packages for government and commercial customers. Interface with customers on every level from upper management to end user training.

PROPOSALS

Proposal development and cost estimation for multiple government and commercial projects. Prepare and present proposals and technical solutions to end customers, senior management. Estimate project hours and hardware cost in conjunction with preparing fixed cost and time and materials proposals.

TECHNICAL MANAGEMENT

Technical group lead of the test group at ASG. Oversee project schedules, customer interfacing, hardware selection and layout, data acquisition hardware, pneumatics, sensors, signal conditioning, machine design, vision inspection and electronics.

DEFENSE AND AEROSPACE APPLICATIONS

MML / MLRS Test Stations (Project Lead): Designed and delivered multiple test stations to the Software Engineering Directorate (SED) at Redstone Arsenal for test development. Stations allowed for automation of software regression testing.

Black Hawk UH/HH 60 Flight Management System (FMS) Automated Test System: Design and development of automatic test stations for regression testing of the FMS software. System simulated the aircraft data busses to simulate the entire cockpit including MIL-STD-1553, ARINC-429, Serial, and Ethernet.

ATACMS Missile ICC Test Sets (Project Lead): Replacement interface for testing of the ATACMS Missile System. System is PXI based with custom LabVIEW application including multiple remote network viewing consoles.

VXI Based Test System for the HAWK Missile Fire Control System: Integration of various VXI instruments from RACAL and TALON into system; Development of Test Executive Software to test architecture; Adaptation of obsolete test procedures to new replacement hardware; Development of Depot level diagnostic software fore use overseas; CMOS Memory Testing.

PC / PXI Based Test Stations for M1 Tank Breach Mechanism (Project Lead): Onsite upgrade of 1950's era hardware to modern PC system; Replaced PLC control with PC-based system; Integration of new hydraulics and hardware with existing test stations.

Durability Test Station for Helicopter Landing Gear and Rotating Rings (Project Lead): Developed software for control of hydraulic systems. Integrated software and hardware with Bell Helicopter Test Equipment.

General Purpose Test Equipment for Redstone Technical Test Center: Integration of multiple instruments into single test system, design of equipment racks.

Calibration Software for NASA Calibration Lab: Control of pressure calibration standards and power supplies, tracking of transducer identification numbers, and generation of calibration reports

Liquid Methane / Oxygen Thruster Development: Led software development for NASA thruster development. System included PXI and SCXI control and high-speed data acquisition. Received NASA Team award.

Valve Water Hammer: Developed software to control valves and acquire high-speed analog data. System included pressure transducers, strain gauges, and flow meters.

Space Shuttle / Solid Rocket Booster Hydraulic Pump Test Stand: Took over software development of hydraulic test stand for production / quality testing of SRB and orbiter hydraulic pump. Included remote Ethernet of software with multiple operator display panels and control and interface with Allen Bradley Servo motors.

M1/M1A1 Azimuth Drive Test Stand (Project Lead): Modernization of test stand for Anniston Army Depot for repair and recertification of Azimuth drive sub assembly for Gunner's Primary Sight.

M1/M1A1 Servo Torque Drive Test Stand (Project Lead): Modernization of test stand for Anniston Army Depot for repair and recertification of Servo Torque drive sub assembly for Gunner's Primary Sight.

MANUFACTURING APPLICATIONS

M1/M1A1 Gunner's Primary Sight Test Stand (Project Lead): Modernization and refurbishment of Gunner's Primary Sight for Anniston Army Depot. Replaced previous manual test station with automated stand.

Biofuel Reactor Control Software (Project Lead): LabVIEW Actor Framework based application to control chemical reactors used to grow biomass to be refined into fuel. Application runs network based with multiple users configuring multiple experiments that run in parallel.

Corrosion Lab Furnace Control System (Project Lead): PXI based control system for four furnaces used for metal corrosion testing. System controls gas injection, temperature, and data logging for test lasting from a few weeks to over a year.

Calibration Software and Pre-Flight Check Software for Private Jets: Automated Calibration procedures for Gulfstream Aerospace; Provided traceability for calibration; Provided On-Board Pre-flight Check software for diagnostics aboard R&D aircraft; Provided onsite delivery and operator training.

Medical Device Testing (Project Lead): Multiple test stations developed to perform automated testing on multiple USB and RF medical devices. Test stations based on National Instruments TestStand and LabVIEW using Agilent LXI equipment. Software interfaces with customer plant database for data archival.

Manufacturing Test Stations for Transformers: Wrote Test Executive software for Production Testing; Provided automatic testing for an assembly process that had been 100% manual; Delivered multiple stations and provided onsite setup and operator training.

Manufacturing Test Stations for Battery Chargers: Wrote Test Executive software for Production Testing; Delivered multiple stations onsite and provided onsite setup and operator training; Production stations have tested over half a million units.

Micro-Spring Testing for Advanced Wafer Probe Manufacturer: Integration of LabVIEW software and Delta Tau motion controller to 3-D orient an 8" part with sub mil accuracy. 3 Test Systems dramatically increase production.

Test Development for Laser Lithography Machine: Integration of large number of instruments into single test platform, including Ethernet, USB, Serial RS-232 / RS-485, GPIB, DNET; Implementation of self-test procedures for test equipment. Implemented custom TestStand interface software.

Development of Multiple Test Systems for the Telecommunications Industry: DSL Modem test stations; Rack Mount Telecommunication Power Supply Test Stations; Multi-port DSL Modem Test Stations; In Circuit Testing (ICT) for DSL modems; Development of Test Procedures for DSL modems; Development of Test Software for Cellular Phones; Design of fixturing for DSL Test Stations.

Development of Production Testers for Circuit Boards: Selection of hardware components and test equipment; Assembly and integration of test stations; Software development for wide spectrum of tests; Development of user-customizable Test Executive to meet specific requirements.

Propeller Inspection Machine (Project Lead): Led development of marine propeller inspection machine to evaluate repaired propellers to ISO standards. Design based on smaller machine, scaled 5 times larger and new custom LabVIEW software developed. The system utilized a non-contact laser for measurements and servomotors to automate scans.

AUTOMOTIVE APPLICATIONS

Automated Truck Hub Inspection Station: Designed and developed non-contact laser based test system to inspect diameters of the large truck hubs. System interfaced with control PLC and ABS inspection system. Results are stored in an Access database.

Speed Sensor Inspection Stations (Project Lead): Developed multiple test stations for inspection of Hall Effect automotive speed sensors. Stations include part marking with dot pin markers and laser engravers.

Electric Motor Characterization Test Stand: PC-based solution for quality lab of automotive manufacturer; Tested multiple part variations with single text fixture and software.

Electric Motor Durability Test Stand: PC-based solution for automotive manufacture; Provided extended testing of units in temperature chamber.

Automotive Seat Pull Test Machines (Project Lead): Programmed and upgraded multiple pull testers; Interfaced PC control with a variety of different hardware interfaces; Rewired and reprogrammed existing test station with limited or no documentation.

Automated Sound and Vibration Test Lines (Project Lead): Assisted on design and development of PC controlled, conveyor based S&V Test Lines; Managed project, scheduling, customer interface, delivery, installation, and onsite setup and training; Designed electrical interface panels for wiring and assembly; Stored data from various tests into single database; Integrated vision inspection system into test system.

Automotive Seat Test Stations (Project Lead): Team lead for 7-member team including mechanical designers, programmers, and technicians. Design and implementation of vibration, vision, and mechanical testing into a single test station with operator interface, database storage, and Ethernet communication with other stations on assembly stations.

Automated Radio Production Testing (Project Lead): Team lead for hardware and software development. System included 2-axis robot with electric button pressing, servomotors for automated knob turning, vision inspection, and interface with assembly line PLC to control 8 test bays.